

Photo-induced Transient Structural Changes of Chromophores Probed by Time-resolved X-ray Diffraction

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In this contribution we report on the experimental characterization of the geometry of short-lived electronically excited states by time-resolved x-ray diffraction (nanosecond – picosecond time scale). Here, the structure factors of a system as a function of time are measured. Since this technique gives complete structural information, it is a very useful tool for learning more about atom motions on the excited-state energy surface — "beyond" the broad band typical of common UV/VIS spectroscopy. We will report about photo-induced disorder-order phenomena in organic solids and photo-induced solid-state reactions. Possible relaxation pathways are presented and on these examples limitations of the present state of the art apparatus are discussed – in particular with respect to future ultrafast x-ray sources.